



## Project ID: 851

JR - Plant Sciences

**Remy Ally**

Grade 7

St. Michael's School – Poway

Advisor: Whitney Wolters



### *A Sweet Approach to Fun Flowers*

The purpose of my experiment is that flowers are often used to show a person's emotions to one another when giving flowers as a gift or decorating someone's home or business. Flower petals are usually one color, but a flower with two or more colors is interesting and different. Most people use the grafting system. The way they do it is by grafting one plant by cutting its bud, then joining it to the stem or root of another plant, and putting the two parts together using twine can create new petal colors, but this takes a lot of effort and time. I found my data by following the procedures. I put a white rose in water with varying amounts of sugar and food dye. From the data that I collected while conducting this experiment, it showed that the more sugar and food dye that I added, it took less time for the flower petals to change colors.

**Project ID: 852****JR - Plant Sciences****Jake Leonhardt**

Grade 8

All Hallows Academy

Advisor: Ali Branson

*Can Lawn Watering Be Cut In Half?*

This project is the comparison between watering amounts to see if the sustainability of grass can be achieved. The hypothesis stated that the grass would sustain itself if watering was cut in half from the nominal amount of watering used for grass. To conduct this experiment, two groups of grass were created with 21 samples in each. I calculated the average amount of water a lawn needs by getting how much per square foot and dividing it by 4 for each sample. One group designated the red group, received 1.2 cups, which was half the normal water amount. The second group designated the blue group received 2.4 cups which is considered the normal amount of water that grass needs to be sustainable. Water for both groups was conducted between the hours of 3 and 4 pm as to alleviate evaporation from the sun. Moisture levels were read over a short period of time. The results indicated that the hypothesis was not supported, in that the grass samples in the half water group (red group) could not sustain itself. Grass that was watered with the normal amount (blue group) showed higher moisture results on all the days, even when the grass was watered. The grass in the red group died faster, absorbing less water and having less moisture and lower level readings. This information tells us that when we water our grass we should stick to about 10.4 cups of water per square foot or more.

**Project ID: 853****JR - Plant Sciences****Madison Muir**

Grade 8

The Children's School

Advisor: Diana Quincannon

*Compost Vs. Soil, Which Boosts Plant Growth?*

This experiment explored the comparison between store-bought and school-made compost. The hypothesis was that if plants were planted in composts and soil, then plants in compost would grow taller. The results were determined by growing arugula over a two week period. For the planting process, each batch of seeds germinated for 3 hours before planting. Each planter was filled with 4 grams of soil, 4-5 seeds, and either soil or a compost on the top. In order to maintain the plants, they received 5 sprays of water two times a day. They were kept in a sunny location whenever possible. Each plant was measured to the nearest  $\frac{1}{2}$  millimeter each week. All of my averaged data proves my research and hypothesis to be true. For example, my week 1 averages were Group A (soil)-3.64 mm, Group B (Store-bought compost)-5.210 mm, and Group C (School-made compost)-4.242 mm. Both of the compost groups' plants grew taller than the control group's. Group B, (store-bought compost) sprouted before the rest of the groups and ended up the tallest group. Group C, school compost, was second tallest. My data supported my hypothesis and proved the benefits of compost that were discussed in my research. If I were to continue or add on to the experiment, I would test the plants for a longer time and in various weather conditions to see how the compost holds and protects the plants. Compost provides countless benefits that are proven by my experiment.



## Project ID: 854

JR - Plant Sciences

**Ellarose Ffrench**

Grade 7

St. Gregory the Great Catholic School

Advisor: Sudipta Dasgupta



### *Effect of Reclaimed, RO, and Well Water on Radishes*

On our ranch we have many plants. We get our water from a well, and it goes through many processes to get rid of minerals in the water to make it better to drink. I want to know if the Reclaimed water affects plants by what minerals are in the water. The Well water may also affect the plants differently because of its strong minerals in the water.

Procedure: First, Gather materials. Then add four cups of water to peat pellets. Let peat pellets expand. Pull back covering and put 2-3 radish seeds inside. Take a picture every morning at 7am. Next, measure height every morning at 7am. Water them everyday at 3 pm = 1 cup of their assigned water to each tray.

Results: I was trying to figure out which water best supports plant life on our ranch. The Reclaimed water had the least amount of growth with only 13/36 seeds sprouted. The radishes showed growth until Day 23 they started to decline. The RO water showed a decent amount of growth with only 10/36 seeds sprouted. While the Well water showed significant growth with 36/36 seeds sprouted. Based on these results, I would use Well water to sustain plant life on our ranch.



## Project ID: 855

### JR - Plant Sciences

Noah Andersen

Grade 8

De Portola Middle School

Advisor: Michael Bridges



### *Effects of Reduced Water on Growth of St. Augustine, Sea Thrift and Fescue*

This project examined how varying water conditions affect the survival and growth of Fescue, St Augustine, and Sea Thrift. It was hypothesized that the height of plants would increase with the amount of water they received, and that non-watered plants would die. Based on the review of literature, Sea Thrift was also hypothesized to grow taller than the other species when watered 1.25 cm of water weekly. The hypothesis was partially supported - the plants not watered all died by the third week, and increasing the water increased the plant growth. By the fourth week, the average differences between St Augustine watered 1.25 cm of water and 2.5 cm of water, and 2.5 cm and 3.75 cm were 1.22 and 0.28 centimeters of plant growth. In Sea Thrift, the average differences between 1.25 cm and 2.5 cm and 1 and 3.75 cm of watering were 2.06 and 1.13 centimeters of plant growth. In fescue, the differences between 1.25 and 2.5 cm and 1 and 3.75 cm were 0.26 cm and 2.13 cm of plant growth. For drought tolerance, St. Augustine grew taller than Sea Thrift and Fescue under low water (1.25 cm of water per week), making it the most drought-tolerant. With 1.25 cm of water per week, by the fourth week, St. Augustine had grown an average of 1.38 centimeters taller than Sea Thrift and 2.17 centimeters taller than Fescue.



## Project ID: 856

### JR - Plant Sciences

Sebastian Flores

Grade 8

Mt. Helix Academy

Advisor:



### *Which Liquids Will Keep a Pear from Oxidizing for the Longest Period?*

The project that I am researching is what liquids help pears from oxidizing. My hypothesis for this experiment is that more acidic liquids will help the pear slices from oxidizing. The liquids I used for this experiment were Minute Maid watermelon juice, apple juice, orange juice, milk, Minute Maid Lemonade, and grape flavored Gatorade. Besides the liquids you will use, you will also need ziploc bags to store the pears slices, a knife and cutting board to cut the pears, and a refrigerated area to store them for a week. After I did the experiment, I looked at each pear slice to see how much oxidation it had gotten and also to see if it had rotten and the color tint of the pear. The results were that the pear with least oxidation and least rotting was the one that was in the Minute Maid Lemonade. The one with the most oxidation and rotting was the one that was in the watermelon punch. It had a lot of dark oxidizing, rotting on the edges, and had gotten a red tint. In conclusion, the most effective liquid was the Minute Maid lemonade and the least effective liquid was the watermelon punch.



## Project ID: 857

### JR - Plant Sciences

Emily Zettle

Grade 8

St. John School – Encinitas

Advisor: Gena Heins



### *Will Vegetables Grow Better with Artificial versus Natural Light?*

Based on my research, more people that home garden use LED lights rather than natural light. If we take a LED light and give the plants the same amount of water and care a plant needs, then we can see how the vegetables react to artificial light instead of natural light. The problem with growing vegetables with natural light is that there are many risk to growing healthy plants for people to eat. The reason I did this project was to know if light could effect the growing process of a plant or if it would grow more vibrantly in taste and color. I predict that the artificial plants will grow, but not as tall as the natural plants. In this project, the growing process of a plant was examined and tested to see which one grew better. The plant got 3 1/3 inches of water and there were 20 plants. The plants were set up in a sunny space with easy access, and inside at room temperature with a LED light running for 9 hours a day. There were 2 types pf vegetables, lettuce and green bean. Looking at the results given from the plant, I saw that my hypothesis was supported. The lettuce average was 0.1% and up to 1.2% in natural light and in artificial light the lowest was 0.70% and up to 4.50%. The green bean average was 1.1% lowest and 2.7% highest for artificial light and 0% and 2.1% for the lowest and highest of natural light. Looking back at the data the artificial light grew better. Although the green beans and lettuce with artificial light grew taller, the natural light plants grew more vibrantly and effectively. If I were to do this project again, I would do it with different color lights and temperatures.



## Project ID: 858

### JR - Plant Sciences

Ruth Garrity

Simon Garrity

Grade 7

The Children's School

Advisor: Diana Quincannon



### *The Power of Fruit*

This project is about how fruit can be a useful energy source and how the ripeness of a fruit affects how efficiently it can create energy. The project was conducted to learn about alternate power sources. We tested the conductivity of oranges picked off a tree the same day of testing, 10 days prior to testing and then 20 days prior to testing. We hypothesized that if the orange was picked 10 days prior to testing it would be more conductive than oranges picked 20 days prior or those picked the day of testing. We used a voltmeter and electrodes to measure the conductivity of the volts in each orange. The average volts of ten day old oranges was 0.9953v; the average of oranges that were 20 days old was 0.9462v; the average volts of the fresh oranges was 0.6691v. Our hypothesis was correct. The ten day old oranges were slightly rotten so we believe they had released methane gas which made them more conductive. The 20 day old oranges were moldy and had significantly shrunk in size, although they were still releasing methane gas, the size of them made them less conductive. The fresh oranges had little gas therefore that may be when they were the least conductive.





## Project ID: 860

### JR - Plant Sciences

Clare Hooper

Reese Gramme

Grade 7

St. Gregory the Great Catholic School

Advisor: Sudipta Dasgupta



*Does Petroleum-based Food Dye and Aspartame Artificial Sugar Affect the Growth of Radish Plants?*

Objective/Goal: Everyday, humans are consuming Red 40 dye and aspartame without knowing. The overall goal for this project was to show the dangers of these substances and to demonstrate the effects.

Hypothesis: If we put petroleum based food dye and aspartame based artificial sugar in a radish plant, then the plants will not grow in a steady and natural pace and will eventually die. We hypothesize that the plants with the mixture of 75% dye and 75% sweetener will grow the worst.

Results: Once we collected all our data, we came to the conclusion that out of all the plants the water one grew the most. The average height for the 100% water based plant was 2.525 inches. Coming in second for largest height growth is the 50% Red 40 dye mix. The average height for the 50% dye mix was 1.075 inches. Next, the 50% aspartame mix came in third. The average height for the 50% aspartame came was 0.925 inches. Next, was the 75% aspartame mix. The average height for the 75% aspartame was 0.775. Lastly, the plant that grew the least was the 75% dye. The average growth for the 75% dye was 0.725.



## Project ID: 860

### JR - Plant Sciences

Reese Gramme

Clare Hooper

Grade 7

St. Gregory the Great Catholic School

Advisor: Sudipta Dasgupta



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## Project ID: 861

### JR - Plant Sciences

Yianna Capetanakis

Grade 8

St. John School – Encinitas

Advisor: Gena Heins



### *What is the Ideal Amount of Water to Grow Romaine Lettuce Plants?*

I started this project to find the optimal amount of water needed to grow Romaine lettuce. Growing plants is a great way to source healthy and delicious food. Lettuce is high in vitamins K and A, helps with hydration, and is beneficial to eyesight and overall health. My motivation for this project was to maximize the growth of lettuce in my home garden. Having a home garden is extremely important to me so that we can have healthy foods on hand daily.

My hypothesis for this project stated that 591 ml of water twice weekly will be the optimal amount of water for growth. The hypothesis was supported by the findings of this experiment. Group 5 which received 591 ml of water had the tallest average group height with an average growth of 19 cm. The lowest group average belonged to Group 3, which was watered 354 mL twice weekly, and had an average growth of 1.3 cm.

However, it should be noted that two of the five plants in Group 3 had zero growth from start to peek. This drastically affected the average group height. Group 1, which received the least amount of water, and had no plants die, grew the least outside of Group 3. It should also be noted that all groups were exposed to 6 days of rainfall which totaled to approximately 1 inch of rainfall. This may have prevented the plants in Group 1 from dying and may have caused the plants in Group 6 to be overwatered.



## Project ID: 863

### JR - Plant Sciences

**Samuel Sternson**

Grade 7

The Rhoades School

Advisor: Roxanne Hunker



### *Production of Natural UV-absorbing Sunscreens in Plant Leaves*

The sun emits many different wavelengths of light, including harmful ultraviolet (UV) light. To avoid damage to plant cells, plants produce UV absorbing molecules, which serve as natural sunscreens. Do plants with more UV exposure possess more of these natural sunscreens? My hypothesis is that plant leaves with more UV exposure will produce more UV absorbing molecules than plants with less sun exposure.

Procedure: With the help of a botanist, I chose eight plant species: four grown in direct sun and four grown in shade. I measured the presence of UV absorbing molecules in extracts of the leaves by measuring UV transmittance, where a lower UV transmittance indicates more UV absorbing molecules. UV transmittance was measured using an Arduino UV detector I created. To ensure reproducibility the experiment was repeated using Orange, Avocado, Black sage, and Peppermint Geranium leaves.

Results: UV transmittance of the leaf extracts was, in order of increasing transmittance, Orange:13%  $\pm$ 1%, 14%  $\pm$ 1% replication experiment, Peppermint geranium: 22%  $\hat{A}$  $\pm$ 4% of UV, 26%  $\pm$ 10% replication experiment, Black Sage:31%  $\pm$ 10%, 30%  $\hat{A}$  $\pm$ 8% replication experiment, Myoporum (grown in sun):32%  $\pm$ 2%, African Daisy: 43%  $\pm$ 11%, Skunk weed: 50%  $\pm$ 2%, Myoporum (grown in shade):50%  $\pm$ 10%, Avocado: 51%  $\pm$  8%, 42%  $\pm$ 12% replication experiment.

Conclusion: The hypothesis was that plant leaves grown with higher sun exposure would produce more UV absorbing molecules than plants with less sun exposure. The plant with the lowest UV transmittance (or greatest UV blocking potential), indicating more UV absorbing molecules present, was Orange, grown in direct sunlight. However, one shade grown plant, Peppermint Geranium, transmitted less UV than some plants exposed to full sun, such as Avocado, Black sage, and Myoporum leaves, indicating that Peppermint Geranium may have high levels of UV absorbing molecules. Myoporum leaves grown in sun had less UV transmittance than Myoporum grown in shade, which might indicate that plants that grow in sun may produce more UV absorbing molecules than plants grown in shade.



## Project ID: 864

### JR - Plant Sciences

Wyatt Arnold

Grade 8

Mt. Helix Academy

Advisor: Kaya MacDonald



### *Do Different Plants Affect the Pesticide Level in Pesticide Runoff?*

In this experiment I will be testing different types of plants against pesticide infected water. I hypothesize that the plants will take away a small fraction of the pesticides but nothing significant will be gotten rid of. I think that the plants will differ in their numbers slightly, but again nothing too much. I tried four different plants, blue fescue, Red fountain grass, Carex blue zinger, and horsetail. First in this experiment you put all of the plants in the pesticide infected water buckets, all of the buckets have to have the same amount of water and pesticide level, then over the next couple of days take the pH level with a pH meter and see how each bucket does in comparison to the other ones. In the end the blue fescue ended up doing the best, I believe that this is because it was much more like a grass and had more roots and I think that this oxidized the water and just absorbed more of the pesticide into the plant. On the other hand the control ended in the middle of all of the plants, the blue fescue and carex blue zinger doing better than it while the horsetail and red fountain grass doing worse than it. In conclusion the plants took much more pesticides out of the plants than I expected they would.



## Project ID: 865

### JR - Plant Sciences

Ihan Sung

Grade 8

Eastlake Middle School

Advisor: Amanda Thacker



### *Is Growing Succulents in Water Faster than Growing Them in Soil?*

Succulents have a particular ability to store a high amount of water, however, they cannot be overwatered, because of the multiplication of a pathogen in the soil that kills the plant. Studies say it is possible to grow succulents in water, but it is not a common practice. However, there are no studies on the efficiency and effectiveness of the method compared to the common soil-grown method.

The experiment consisted in growing 8 succulents, 4 in soil and 4 in water. However, if a whole leaf is wet it can rot (“Effects of Supplementary Lighting Intensity and Duration on Hydroponically Grown Crassulaceae Species”, so I mixed equal amounts of perlite and the water and filled a plastic box with the mix, to keep the leaf up the water and the roots in the water. For the soil, I used equal amounts of perlite and peat moss and also filled a plastic box with the soil. Perlite and peat moss are common soil mixes for succulents.

After approximately a week of pulling the leaves off, they started rooting and I moved them to their proper boxes. I watered and measured, and recorded the succulents each Friday.

After 5 weeks I had obvious results: water-grown succulents were twice as tall and twice as big as soil-grown succulents. So my hypothesis was correct, water grown succulents grew faster than soil-grown succulents



## Project ID: 866

### JR - Plant Sciences

**Maya Armstrong**

Grade 8

Mt. Helix Academy

Advisor: Kayla MacDonald



### *Capillary Action of Water in Plants*

This project was to show Capillary Action of Water in Plants, and my hypothesis was that the colored dye would show up in the stems; showing how much water plants “drink”. Instead, the water colored the petals. However, I was still able to see how much water got into the plants based on how colored the petals were. For example, one blue flower was not very colored; with a few tiny spots of blue. But some other blue flowers were almost completely colored. My conclusion is that the project didn’t go as planned because I didn’t use the same flower Science Buddies said to use (carnations, but I had to use different flowers to make the project different), and I used roses.



## Project ID: 867

### JR - Plant Sciences

Charlotte Birch

Grade 8

City Tree Christian School

Advisor: Michelle Lee



### *The Effect of pH on Growing Cress in Lunar Soil Simulant*

This topic was investigated because it could be beneficial for growing plants on the moon. It may be helpful to grow plants in a lunar simulant on Earth so scientists can predict results and be more prepared for when we actually grow plants on the moon. The hypothesis for this experiment was that the cress watered with more acidic (lemon juice) water will grow the tallest and have the most germinations.

This hypothesis was tested by putting 30g of lunar simulant in a coffee-filter lined egg cup, scattering cress seeds across the surface, then watering the sample groups with three different pH levels. I recorded when the seeds germinated, the number of germinations, how tall the germinations were, and took a general observation of the sample groups daily.

My hypothesis was supported. I believe that this was because cress prefers an acidic soil on earth and the acidic water lowered the high lunar soil pH the most. However, the soil watered with distilled water also grew the cress, but it was shorter by 6.5% and grew slower by 1 day. This may be because it did not lower the pH of the lunar simulant as much.

Therefore, on average, the acidic samples grew the highest, germinated more quickly and was the overall best substance for making cress viable in lunar simulant. There are many further investigations I could look into, for example changing what I used to alter the pH and changing other conditions to be more like those on the moon.





## Project ID: 868

### JR - Plant Sciences

Kennedy Hall

Grade 8

Mt. Helix Academy

Advisor: Kayla MacDonald



### *What Kind of Flower Food is Best to Keep a Bouquet Fresh?*

This project examined the effects of different types of flower food on cut flower stems to determine which helps them last longest. It was hypothesized that the flowers in the vases filled with homemade flower food and brown sugar would keep the flowers fresh longest. 10 cut stems of each flower (carnation, alstroemeria, chrysanthemum) were set up into vases with different flower foods. There was water, store bought packets, homemade with cane sugar, and homemade with brown sugar. Data was recorded for days staying fresh in the different substances. The results supported the hypothesis; the flowers in the brown sugar food lasted longest.



## Project ID: 869

### JR - Plant Sciences

**Tymbur Larsen**

Grade 6

City Tree Christian School

Advisor: Michelle Lee



### *The Effects of Water Types on Chia Seed Growth*

Plants are important to the environment and I was wondering what water in my resources I could use to help plants grow better and thrive in their ecosystem. I was wondering what water type would work best for watering chia seeds, such as salt water, fresh water, and tap water. I will test different types of water and then measure the height of each plant every day. Salt water generally has a lot of salt. I think it will be too much for the chia seeds because I think it will dry them out. Tap water will probably work better than salt water even though the tap water has more chlorine in it and might have more side effects later on. If I change the types of water then I will be able to see which type of water is best for growing chia seed plants.



## Project ID: 870

### JR - Plant Sciences

Emerson Villarroel

Grade 7

City Tree Christian School

Advisor: Michelle Lee



### *The Effect of Paper Bags on Plums Ripening Process*

This project seeks to test if putting a plum in a brown bag will affect the ripening process of the plum. I hypothesize that by the end of 4 days the plums in the brown bag will be:

- Softer in pressure
- Riper
- Darker in color (inside and out)
- Pit will be larger
- It will be heavier because of the juice
- Bigger in size in diameter
- The color of the pit will be darker
- It will be much sweeter in taste

The investigator plans on determining if a brown bag affects a plum and makes it ripen quicker than outside of the brown bag. This project helps people identify if using a brown bag affects the plums' ripening process. This project is important because people could use their spare brown bags from grocery stores or lunches to ripen their fruit instead of throwing the bags away and wasting a perfectly good fast ripening method.



## Project ID: 871

### JR - Plant Sciences

Liz Bruno

Katie Onstott

Grade 8

Stella Maris Academy

Advisor: Sara Eckmann



#### *L.L.T.B.P (LED Light Test on Bonnie Succulent Plants)*

People have studied which lighting is best for normal plants, what about succulents? In today's world, people might have problems with their succulent plant's growth. By answering the question, Which light, red, blue, red and blue LED, or sunlight will affect the Bonnie succulent plant's growth, in a positive way, the best?, we can suggest putting the plants under that light to help it grow better.

How we tested this, was that we had forty of the same succulent plant, ten for each type of lighting, and made boxes that had the led bulbs needed connected on the inside. At certain times of every day, we turned on the lights and turned them off. Then biweekly, we'd mark down each plant's height, and at the end, we would see how much each plant had grown from start to end, and take the average of how much they grew. The lighting with the highest average would be the lighting that affected the plant's growth, in a positive way, the best/more.

The results show that the sunlight had an average of (about) 3.5 cm whereas the blue light was -0.8, the red light was 1.4, and the red and blue lighting was 0.6. With these results of the averages, it shows that the sunlight affected the Bonnie succulent plant's growth, in a positive way, the best/more. In conclusion, this shows that the sunlight affected the Bonnie succulent plant's growth, in a positive way, the best/more

